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AMBIENT NOISE MEASUREMENTS AND INVERSIONS IN COASTAL AND CONTINENTAL SHELF WATERS

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LONG-TERM GOALS

The objective is to characterize the spatial properties of the ambient noise field in shallow water, and in particular to identify the effects that the seabed has on the spatial coherence of the noise. A full theory of the geoacoustic properties of porous materials is also being constructed, particularly in connection with marine sediments. By combining the theory of the bottom with measurements of the noise field, new inversion techniques for remotely determining the bottom geoacoustic parameters can be developed.

SCIENTIFIC OBJECTIVES

The main scientific objectives are to collect and interpret ambient noise coherence data at several shallow water sites where the bottom properties are known; and to lay the foundations of a new theory of the geoacoustic properties of marine sediments.

APPROACH

Pairs of hydrophones arranged vertically and separated by about 1 m are deployed in coastal waters, where the water depth is in the region of 100 m. Data are recorded on both channels over a bandwidth of 20 kHz. The spatial coherence is computed from the data as a function of frequency and compared with theoretical coherence curves.

With regard to the theoretical treatment of porous media, a new mechanism is being explored, which is based on the idea that the medium shows hysteresis as far as the dissipation is concerned. The idea has not previously been developed, and appears to yield results that are consistent with a wide range of observations.

WORK completed

High quality noise coherence data have been collected at two "calibrated" shallow water sites, where the bottom properties have been established in previous surveys. One site is off the coast of New Zealand and the second is off Eureka, northern California. The data have been analyzed and compared with theoretical predictions.

in review (1997).
5. M.J. Buckingham, "Theory of wave propagation in consolidated porous media," J. Acoust. Soc. Am., **in preparation** (1997).